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# TRANSLATION FROM GERMAN

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**(54) Disposable diapers**

(57) A disposable diaper comprising an outer layer, which is impermeable to liquids, an intermediate layer, which absorbs liquids, and a lining, which is permeable to liquids, characterized by the feature that the lining comprises one or more substances that are selected from the group comprising lubricating agents, hydrophobic substances, agents to lower the pH, disinfectants bacteriostatic agents and substances that are capable of healing, alleviating or soothing diaper dermatitis.

**Description**

The present invention pertains to disposable or throw-away diapers. Specifically, the present invention pertains to such diapers in which the layer that is in contact with the skin (designated the "lining" in the following sections) comprises a primary substance, which protects the skin, or a substance with which diaper dermatitis can be treated, i.e. healed, alleviated or soothed. Diaper dermatitis (also known as "diaper rash") is an irritation of the skin which is brought about by wetness of the skin and is caused mainly by urine.

Disposable diapers are used frequently all over the world and, specifically, in the developed countries. A disposable diaper comprises an outer layer, which is impermeable to liquids, a lining, which is permeable to liquids, and an intermediate layer which absorbs liquids. As is known, the use of such diapers regularly leads to diaper dermatitis.

One of the primary factors that leads to diaper dermatitis is wetness of the skin, which is produced by urine which is sealed in on the skin, and this increases its coefficient of friction and leads to increased abrasion and injury as a result of wounds due to rubbing. Wet skin also has a higher permeability and this facilitates the penetration of irritating substances and leads to the growth of microorganisms thereon. These microorganisms comprise bacteria, which are capable of producing ammonia from urea, and this brings about an increase in the pH value of the surface of the skin. Such an increase in pH value has an irritating effect of its own on the skin and is consequently an additional factor in causing diaper dermatitis.

The wetness of the skin in disposable diapers that are currently obtainable is reduced by the inclusion of a highly absorbent intermediate layer in the diapers. Such a layer generally comprises a cellulose material, optionally in combination with super-absorbent polymers (SAP) that are manufactured from crosslinked sodium polyacrylate that has the capability of absorbing many times its own weight of liquid. SAP, which is a powder-type material and which is added to the absorbent core (the intermediate layer) that is situated in between, also has a certain pH buffer capacity and, as a result, prevents any uncontrolled increase in pH value. However, since the SAP is not in contact with the skin, its buffering action is not always sufficient to prevent an increase in the pH value of the skin.

Thus the possibilities that are available today for reducing diaper dermatitis are not always satisfactory and better and more efficient means are desirable.

Thus the objective of the present invention is to make available an improved disposable diaper that reduces the occurrence and the severity of diaper dermatitis in comparison to the disposable diapers of the prior art.

In particular, the objective of the present invention is to make available a disposable diaper in which the lining, which is permeable to liquids, comprises a substance that is capable of reducing or preventing the occurrence of diaper dermatitis.

The invention is based on a new concept in accordance with which diaper dermatitis is alleviated and its occurrence is reduced considerably by providing the lining with a primary substance, which protects the skin, or a substance that is capable of treating such skin injuries.

Accordingly, the present invention makes available a disposable diaper that comprises an outer layer, which is impermeable to liquids, an intermediate layer, which absorbs liquids, and a lining, which is permeable to liquids, characterized by the feature that the lining comprises one or more substances that are selected from the group that comprises lubricating agents, hydrophobic substances, agents to lower the pH, disinfectants, bacteriostatic agents and substances that are capable of healing, alleviating or soothing diaper dermatitis.

The disposable diapers in accordance with the invention have been designed for use by children or adults who are suffering from urinary incontinence.

Non-limitative examples of these substances are enumerated below in accordance with their function and comprise:

lubricating agents such as silicone, unrefined vaseline, sorbitan oleate, polydimethylsiloxanes, mineral oil and silicon dioxide;

hydrophobic substances such as lanolin, jojoba oil, paraffin oil, unrefined vaseline, beeswax, wool fat, wool alcohols, acetylated wool alcohols, mineral oil and Peru balsam;

an agent that reduces the pH such as citric acid;

disinfectants such as phenethyl alcohol, dichlorobenzyl alcohol, Preventol RB50 and propyl hydroxybenzoate;

bacteriostatic agents such as sorbitan, dichlorobenzyl alcohol, citric acid and propyl hydroxybenzoate;

substances that soothe skin rash such as aloe-vera gel, jojoba oil, camomile, propylene glycol, allantoin, glycerine, cetyl alcohol and starch;

agents that heal and alleviate skin rash such as lanolin, aloe-vera gel, paraffin oil, unrefined vaseline, zinc oxide, panthenol, sorbitan monoisostearate, camomile, azulene, propylene glycol, allantoin, wool fat, glycerine, wool alcohols, acetylated wool alcohols, Peru balsam, collagen, and marine algae extracts;

and other materials with properties similar to the above-mentioned ones.

The substances can be contained in the lining in various forms. For example, they can be applied

to the lining or added to the lining in the form of a salve, an ointment, a liquid, a cream or a gel and, generally, in any known form that is suitable for such application.

The substances can be incorporated into the initial material used for the lining, especially prior to its use in the manufacture of the diapers. Alternatively, the substances can be incorporated into the lining after the manufacture of the diapers. Their incorporation can be carried out, e.g. by spraying, roller coating, stamping or impressing.

In the case of the diapers in accordance with the invention, the substances can have been incorporated into the entire surface area of the lining or only in a part thereof including, specifically, the crotch region and some other regions of the skin that tend to form skin dermatitis.

Patent claims

1. Disposable diaper or throw-away diaper comprising an outer layer, which is impermeable to liquids, an intermediate layer, which absorbs liquids, and a lining, which is permeable to liquids, **characterized by the feature** that the lining comprises one or more substances that are selected from the group comprising lubricating agents, hydrophobic substances, agents to lower the pH, disinfectants, bacteriostatic agents and substances that are capable of healing, alleviating or soothing diaper dermatitis.
2. Disposable diaper in accordance with claim 1, characterized by the feature that the substance is a lubricating agent that is selected from the group comprising silicone, unrefined vaseline, sorbitan oleate, polydimethylsiloxanes, mineral oil and silicon dioxide.
3. Disposable diaper in accordance with claim 1, characterized by the feature that the substance is a hydrophobic substance that is selected from the group comprising hydrophobic compositions such as lanolin, jojoba oil, paraffin oil, unrefined vaseline, beeswax, wool fat, wool alcohols, acetylated wool alcohols, mineral oil and Peru balsam.
4. Disposable diaper in accordance with claim 1, characterized by the feature that the substance is an agent which reduces the pH, namely citric acid.
5. Disposable diaper in accordance with claim 1, characterized by the feature that the substance is a disinfectant that is selected from the group comprising phenethyl alcohol, dichlorobenzyl alcohol, Preventol RB50 and propyl hydroxybenzoate.
6. Disposable diaper in accordance with claim 1, characterized by the feature that the substance is a bacteriostatic agent that is selected from the group comprising sorbitan, dichlorobenzyl alcohol, citric acid and propyl hydroxybenzoate.
7. Disposable diaper in accordance with claim 1, characterized by the feature that the substance is a soothing substance that is selected from the group comprising aloe-vera gel, jojoba

oil, camomile oil, propylene glycol, allantoin, glycerine, cetyl alcohol and starch.

8. Disposable diaper in accordance with claim 1, characterized by the feature that the substance is a substance that heals or alleviates wounds and which is selected from the group comprising lanolin, aloe-vera gel, paraffin oil, unrefined vaseline, zinc oxide, panthenol, sorbitan monoisostearate, camomile oil, azulene, propylene glycol, allantoin, wool fat, glycerine, wool alcohols, acetylated wool alcohols, Peru balsam, collagen and marine algae extracts.